Alg. 2 Warm Up # 9-1

1. Use log properties to help you solve:

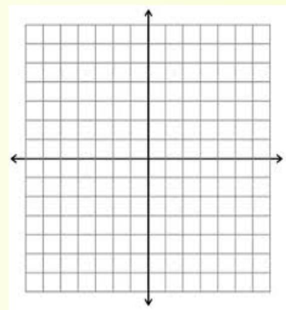
   log (x + 3) + log x = 1

2. Solve by completing the square. Answer exact and simplified:

   $5x^2 + 20x - 4 = 0$

3. Exponential growth or decay? State the equation of the horizontal asymptote and sketch the graph.

   $y = 2^x - 3$

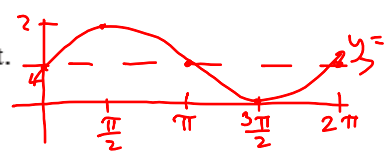


HW Questions:

Review & Preview

7-116. Imagine the graph $y = \sin(x)$ shifted up one unit.

a. Sketch what it would look like.



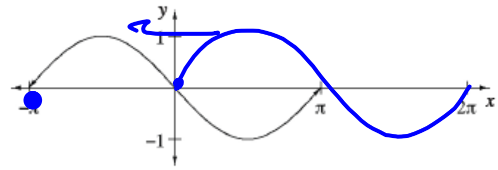
b. What do you have to change in the equation $y = \sin x$ to move the graph *up* one unit? Write the new equation. $y = \sin x + 1$

c. What are the intercepts of your new equation? Label them with their coordinates on the graph. x-int: $\left(\frac{3\pi}{2} + 2\pi n, 0\right)$ y-int: $(0, 1)$

d. When you listed intercepts in part (c), did you list more than one x-intercept? Should you have?

yes, there are infinite. 2π multiples of $\frac{3\pi}{2}$

7-117. The graph at right was made by shifting the first cycle of $y = \sin x$ to the left.



a. How many units to the left was it shifted?

b. Figure out how to change the equation of $y = \sin x$ so that the graph of the new equation will look like the one in part (a). If you do not have a graphing calculator at home, sketch the graph and check your answer when you get to class.

$y = \sin(x + \pi)$

7-118. Which of the situations below (if any) is best modeled by a cyclic function? Explain your reasoning.

a. The number of students in each year's graduating class.

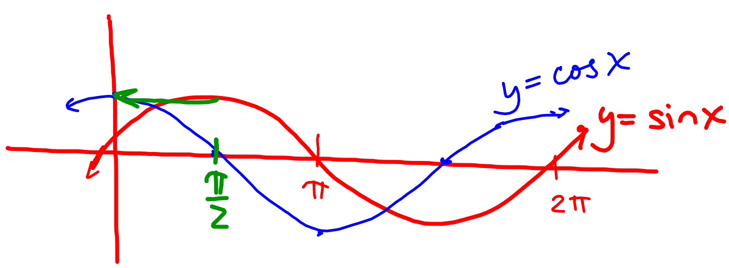
b. Your hunger level throughout the day.

c. The high-tide level at a point along the coast.

(skip 119)

7-120. Should $y = \sin x$ and $y = \cos x$ both be parent graphs, or is one the parent of the other? Give reasons for your decision.

Don't need to. $y = \cos x$ is just the sine graph shifted left $\frac{\pi}{2}$



$\cos x = \sin\left(x + \frac{\pi}{2}\right)$

7-121. Find the equation of the exponential function of the form $y = ab^x$ that passes through each of the following pairs of points.

a. $(1,18)$ and $(4,3888)$

b. $(-2,-8)$ and $(3,-0.25)$

7-122. Solve each of the following equations. Be sure to check your solutions.

a. $\frac{3}{x}+\frac{2}{x+1}=5 \longrightarrow \frac{2}{x+1} = \frac{5x}{x} - \frac{3}{x}$

$\frac{2}{x+1} = \frac{5x-3}{x}$

Now cross multiply.

b. $x^2+6x+9=2x^2+3x+5$

b) $0 = x^2 - 3x - 4$

c. $8-\sqrt{9-2x}=x+3$

$-8 \qquad\qquad -8$

$-\sqrt{9-2x} = x-5$

$\left(\sqrt{9-2x}\right)^2 = (5-x)^2$

$9-2x = 25-10x+x^2$

$0 = x^2-8x+16$

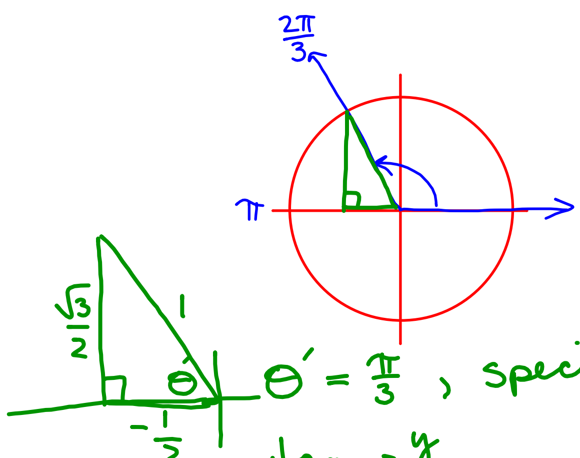
$0 = (x-4)^2$

$x = 4$

7-123. Evaluate each of the following expressions exactly.

a. $\tan\frac{2\pi}{3}$

b. $\tan\frac{7\pi}{6}$



$\theta' = \frac{\pi}{3}$, special Δ ratios.

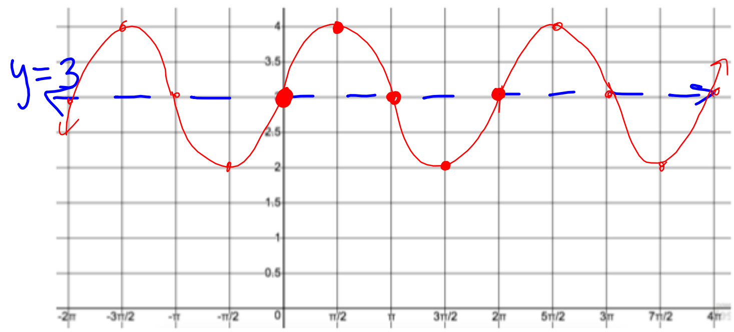
$\tan \rightarrow \frac{y}{x}$

$\frac{\frac{\sqrt{3}}{2}}{-\frac{1}{2}} = \boxed{-\sqrt{3}}$

Friday's CP's:

a. Write an equation for each part below and sketch a graph of a function that has a parent graph of $y = \sin x$, but is:

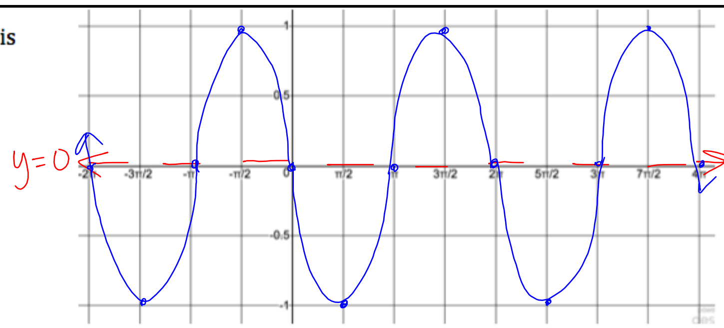
i. Shifted 3 units up.

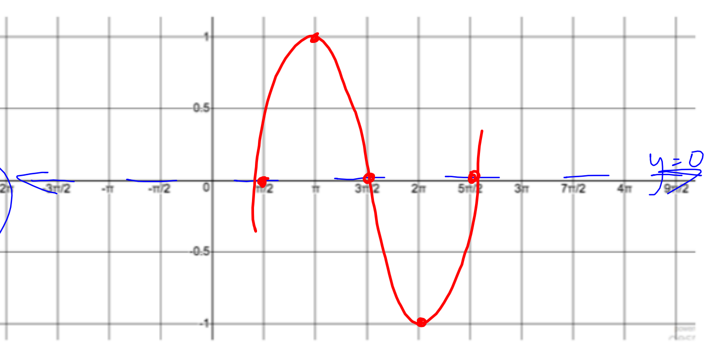


$y = \sin x + 3$

ii. Reflected across the x-axis

$y = -\sin x$

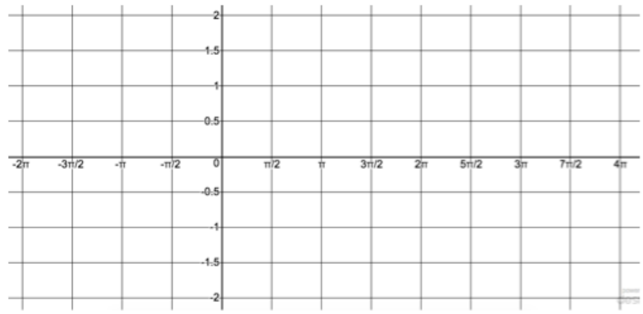




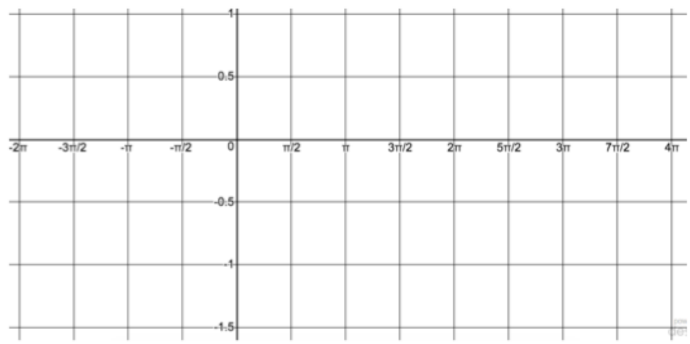
iii. Shifted $\frac{\pi}{2}$ units to the right.

$y = \sin\left(x - \frac{\pi}{2}\right)$

iv. Vertically stretched by a factor of 2.



v. Shifted left by π units and shifted down by 0.5 units.



Today's Classwork

1) Build a Unit Circle from Memory.

First practice today. Quiz on Friday.

2) Transform $y = \sin x$ using the 5-point summary. Salmon WS and graphs.

*Juniors who are testing: this is optional extra credit for you.

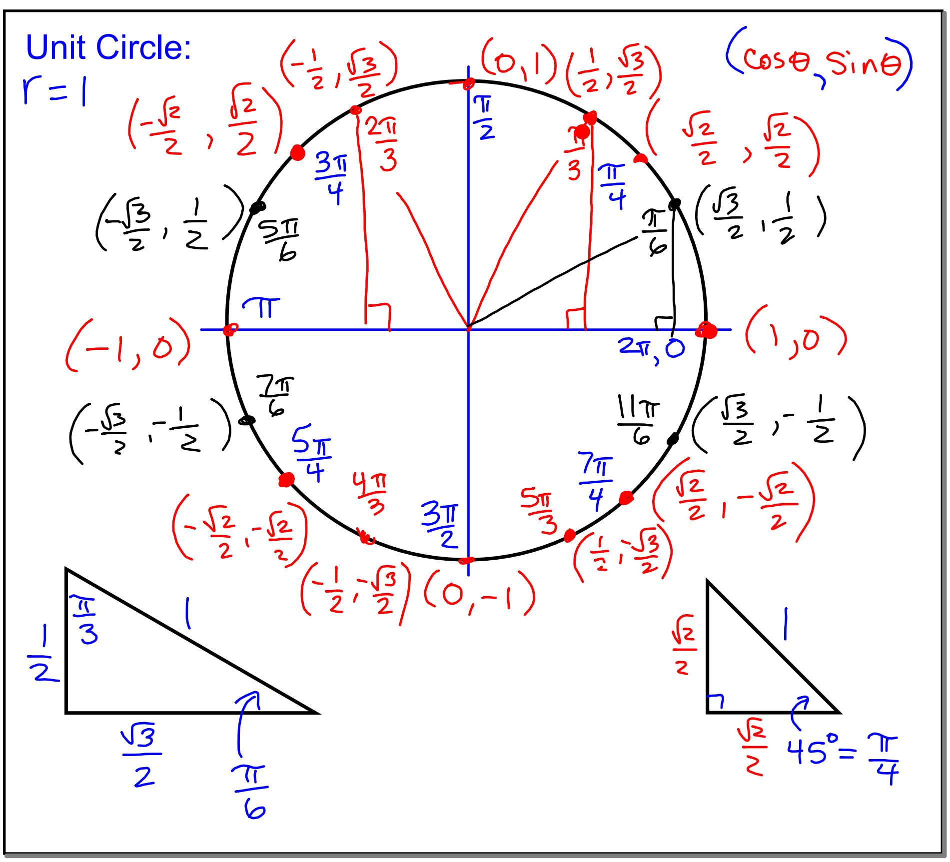
Building a Unit Circle from Memory:

1) Fill in all the radian measures on the inside of the circle. Count fractions of pi.

2) Fill in the coordinates for the points on the axes.

3) Use your special triangle relationships to fill in the coordinates in Quadrant I.

4) Use Quadrant I coordinates to fill in the others.

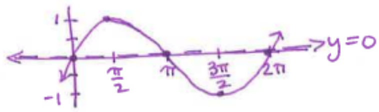


Alg 2B Transformations of $y = \sin x$ Name ____________
Classwork

Team ____ Per. ____

Find the 5-point summary for one complete cycle of each graph. Label the x-axis in radians for each of the 5 points, write the equation of the midline and show a dashed line on your graph. Carefully draw just the one cycle of the graph.

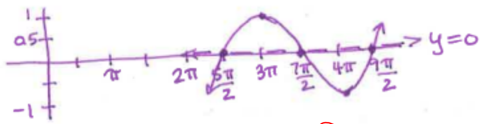
Example: $y = \sin x$



5-point summary:
3 x-intercepts at $x = 0, \pi, 2\pi$
1 max at $(\frac{\pi}{2}, 1)$
1 min at $(\frac{3\pi}{2}, -1)$

Midline
$y = 0$

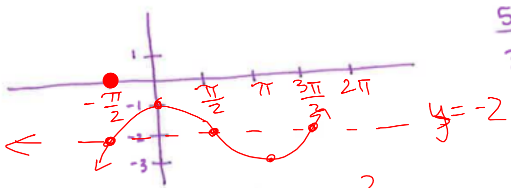
Example: $y = \sin(x - \frac{5\pi}{2})$ transformation: shift right $\frac{5\pi}{2}$



5-point summary:
3 x-intercepts at $x = \frac{5\pi}{2}, \frac{7\pi}{2}, \frac{9\pi}{2}$
1 max at $(3\pi, 1)$
1 min at $(4\pi, -1)$

Midline at $y = \underline{0}$

Example: $y = \sin(x + \frac{\pi}{2}) - 2$ transformations: down 2, left $\frac{\pi}{2}$



5-point summary:
3 ~~x-intercepts~~ intersections at $x = -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$
1 max at $(0, -1)$
1 min at $(\pi, -3)$

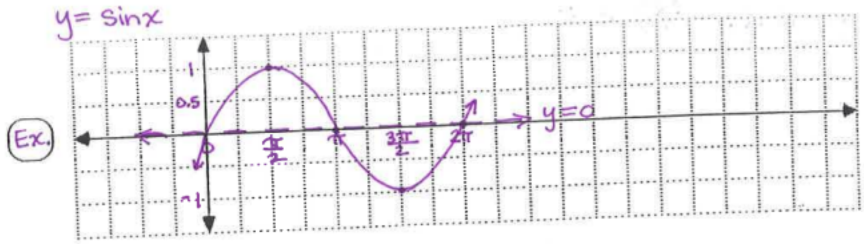
Midline at $y = \underline{-2}$

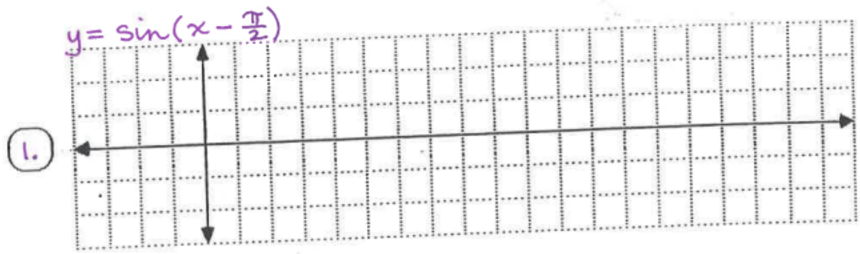
1) $y = \sin(x - \frac{\pi}{2})$
transformations:
5-point summary:

Midline:

2) $y = \sin x - 1$
transformations:
5-point summary:

Midline:





HW: Checkpoint 8B,

Back of the book, pg. CP 16.

Do # 1- 20

Copy the original problem and show clear process to support your answer.

*Juniors who are testing: Do the HW & Warm up. Classwork is optional.